

HEWLETT-PACKARD COMPANY
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PATENT APPLICATION

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UNITED STATES PATENT AND TRADEMARK OFFICE

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Confirmation No.: 1876

Inventor(s): Jeans et al.

Application No.: 10/696,825

NOV 14 2005

Examiner: G. Peralta

Filing Date: 10/30/2003

Group Art Unit: 2814

Title: A METHOD FOR COATING A SEMICONDUCTOR SUBSTRATE WITH A MIXTURE
CONTAINING AN ADHESION PROMOTER

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(complete (a) or (b) as applicable)

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Rev 12/04 (Aplbrief)

Respectfully submitted,

Jeans et al.

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Patent
Docket No. 100200028-7

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

APPEAL NO. _____

In re Application of:
Albert Hua Jeans et al.

Serial No. 10/696,825
Filed: October 30, 2003

Confirmation No. 1876
Examiner: Ginette Peralta
Art Unit: 2814

For: **A METHOD FOR COATING A SEMICONDUCTOR SUBSTRATE
WITH A MIXTURE CONTAINING AN ADHESION PROMOTER**

APPEAL BRIEF

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INDEX

	Page
1. REAL PARTY IN INTEREST	1
2. RELATED APPEALS AND INTERFERENCES	1
3. STATUS OF CLAIMS	1
4. STATUS OF AMENDMENTS	1
5. SUMMARY OF CLAIMED SUBJECT MATTER	1
6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL .	3
7. ARGUMENTS.....	3
Rejection of independent claim 17 under 35 USC §103(a) as being unpatentable over Beckham et al. U.S. Patent No. 4,604,644 in view of Norland Optical Adhesive and HD Microsystems	
8. CLAIMS APPENDIX	6
9. EVIDENCE APPENDIX	None
10. RELATED PROCEEDINGS APPENDIX	None

Serial No. 10/696,825

- i -

1. REAL PARTY IN INTEREST

The real party in interest is the assignee, Hewlett-Packard Development Company.

2. RELATED APPEALS AND INTERFERENCES

No appeals or interferences are known to have a bearing on the Board's decision in the pending appeal.

3. STATUS OF CLAIMS

Claims 17-20 are pending.

Claims 17-20 are rejected.

The rejections of claims 17-20 are being appealed.

4. STATUS OF AMENDMENTS

No amendment was filed subsequent to final rejection.

5. SUMMARY OF CLAIMED SUBJECT MATTER

The semiconductor industry relies on coating technology for the fabrication of products with complex, sequentially coated layers with specific chemical or physical properties. Multi-layer coatings may be used in a typical semiconductor to create separate insulating layers, semiconductor layers, and conducting layers to produce electronic components such as capacitors and transistors, on a microscopic scale.

Claim 17 recites an article comprising a semiconductor substrate; and a coating mixture on the semiconductor substrate. The coating mixture comprises adhesion promoter and photopolymer. The adhesion promoter contains α -amino

Serial No. 10/696,825

-1-

propyltriethoxysilane in organic solution. The adhesion promoter enhances the wettability of the semiconductor substrate.

Figure 2a illustrates, and paragraph 17 describes an example of a substrate 201 and mixture 202. The photopolymer is described in paragraph 14, and the adhesion promoter is described in paragraph 15. The mixture of the adhesion promoter and photopolymer is described in paragraph 18 and illustrated in Figure 1, step 105. Application of the mixture on the substrate is described in paragraph 19 and illustrated in Figure 1, step 106.

Paragraph 16 reveals that the adhesion promoter enhances the wettability of the semiconductor substrate. This, in turn, enables the photopolymer to spread evenly and uniformly across the substrate.

Serial No. 10/696,825

-2-

6. GROUND OF REJECTION TO BE REVIEWED ON APPEAL

Rejection of independent claim 17 under 35 USC §103(a) as being unpatentable over Beckham et al. U.S. Patent No. 4,604,644 in view of Norland Optical Adhesive and HD Microsystems.

7. ARGUMENTS

The office action cites Beckham U.S. Patent No. 4,604,644 as a primary reference. Figures 5-6 of Beckham show a device 10 bonded to a substrate 5 by solder bonding terminals 13. A dielectric 30 fills the gaps between the terminals at the periphery of the device 10 (col. 6, lines 43-47). The dielectric can be made of a suitable organic polymerized resin that has the ability to coat effectively and bond to the solder terminals, the semiconductor device and the substrate (col. 6, lines 49-57). A resin - AI-10 - is described at col. 6, line 57 to col. 7, line 10. The resin can be mixed with an adhesion promoter (col. 7, lines 10-16).

Beckham does not teach or suggest mixing a photopolymer with an adhesion promoter that contains α -amino propyltriethoxysilane in organic solution.

The office action cites a first data sheet by Norland Optical Adhesive. The first data sheet describes the photopolymer NOA83H. According to the first data sheet, the photopolymer NOA83H is a single component adhesive that is used to bond optical components.

The office action cites a second data sheet by HD Microsystems. The second data sheet describes the adhesion promoter VM-652. According to the

Serial No. 10/696,825

second data sheet, VM-652 is used to improve adhesion of polyimide coatings to silicon dioxide and silicon nitride-coated wafers. The second data sheet states quite explicitly that VM-652 is applied to a wafer and dried before a polyimide coating is applied to the wafer. It is not mixed with a polyimide.

The office action nevertheless concludes that it would be obvious to mix an adhesion promoter such as VM-652 with a photopolymer or resin. The office action also concludes that it would be obvious to use the photopolymer NOA83H instead of, or in addition to, Beckham's resin AI-10.

The office action offers no evidence to suggest mixing the VM-652 with a photopolymer or resin. The second data sheet explicitly states that the VM-652 is applied before a polyimide coating is applied. Moreover, the second data sheet does not teach or suggest that an adhesion promoter such as VM-652 would promote good bonding to solder terminals, as required by Beckham.

The first data sheet teaches away from mixing the NOA83H with another component. It states that the photopolymer NOA83H is a single component adhesive.

The office action offers no evidence to suggest using photopolymer NOA83H instead of, or in addition to, the AI-10 resin. The first data sheet does not teach or suggest that the photopolymer NOA83H is a suitable alternative to the resin AI-10. Photopolymer NOA83H has different properties than resin AI-10. The resin AI-10 is not a photopolymer. It is heated to cause a polymerizing reaction (col. 7, lines 9-10).

Serial No. 10/696,825

-4-

The office action alleges that NOA83H and VM-652 would improve the properties and bonding of Beckham's dielectric. However, the office action provides no evidence to support this allegation. The allegation is unsubstantiated. An examiner's unsubstantiated allegations with respect to knowledge in the prior art does not provide evidence of suggestion, particularly in light of a challenge. See In re Ahlert, 424 F2d., 1088, 1081-92 165 USPQ 418, 420-421 (CCPA1970). The examiner's unsubstantiated allegations were challenged in a response to a previous office action. The allegations remain unsubstantiated.

In conclusion, the examiner is engaging in hindsight reconstruction of the claimed invention, using applicants' structure as a template and selecting elements from the cited documents to fill the gaps. Such hindsight reconstruction does not provide a legal basis for a '103 rejection.

The '103 rejection of claim 17 should be withdrawn. Accordingly, claim 17 and its dependent claims 18-20 should be allowed over the documents made of record. The Honorable Board of Patent Appeals and Interferences is respectfully requested to reverse the '103 rejection.

Respectfully submitted,

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Date: November 14, 2005

Serial No. 10/696,825

-5-

8. CLAIMS APPENDIX

Claims 1-16 (Cancelled)

17. (Previously presented) An article comprising a semiconductor substrate; and a coating mixture comprised of adhesion promoter and photopolymer on the semiconductor substrate, the adhesion promoter containing α -amino propyltriethoxysilane in organic solution.

18. (Previously presented) The article of claim 17 wherein said semiconductor substrate is a flexible amorphous silicon-coated web.

19. (Previously presented) The article of claim 17 wherein the photopolymer contains mercapto-ester in solution.

20. (Previously presented) The article of claim 19 wherein said coating mixture is applied to said semiconductor substrate using spin coating.

Claims 21 (Cancelled)

Serial No. 10/696,825

-6-

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